C3.2.11 Forms

Examples of forms to follow:

Bridge Cost Estimate for Concept Statement

Location:

County: Lucas	Proj. No.: BRF-014-2(34)--38-59
Des. No.: 1054	Pin No.: 09-59-014-010
Maint. No.: 5927.3S014	FHWA No.: 34460
On IA 14 over English Creek	Sta.: 502+19.1
Section 13,T73N,R21W	
Functional Class:	ADT: 2580 vpd
By: D. Claman	Date: 5/17/2010

Existing Bridge:

Type: I-Beam	Length x Width: 60' x 30'
Pier Type: N/A	Abut. Type: Stub
Spans: 60	Approach Pavement Width: 30
Skew: 0	Design Loading:

Drainage Area: 7.8 sq. mi.
Existing Bridge Width Acceptable: No
New/Reconstructed Roadway Width: 44.0'
Repair/Remodel by Staging Traffic: Yes

General Comments: Existing bridge is a 4-beam single span structure that could be staged. Stage 1 lane width would be 15' wide and Stage 2 lane width would be approximately 12 feet wide with an additional 2' wide bridge. Staging a slab bridge may create constructability issues due to deflection and false-work.

Option A - Stage 110' x 46' CCS Bridge

Type: CCS	Length x Width: 110' x 46'
Pier Type: Pile Bent	Abutment Type: Integral
Spans: 1 @ 35', 2@27.5'	Skew: 0.0

Stage Traffic: Yes, One 15' Lane - Stage 1, One 12' Lane - Stage 2
Costs:

Bridge - 110' x 46' @ $75/sf	= $ 379,500
Remove Exist. Bridge -60' x 30' @ $7.00/sf	= $ 12,600
Riprap Berms	= $ 50,000
Staged Construction (10%)	= $ 44,210
Mobilization (10%)	= $ 44,210
Contingency (15%)	= $ 66,315
Total Option A	$ 596,835

Comments: Staged CCS bridges may have constructability issues depending upon the contractor.

Page 1 of 2

Bridge Concept Statement 4/12/2011

Lucas County
BRF-014-2(34)—38-59

Option B - 110' x 44' CCS Bridge - Detour

Type: CCS	Length x Width: 110' x 44'
Pier Type: Pile Bent	Abutment Type: Integral
Spans: 1@35.0, 2@ 27.5'	Skew: 0.0
Stage Traffic: No	

Costs:

Bridge - 110' x 44' @ $75/sf	= $ 363,000
Remove Exist. Bridge 60' x 30' @ $7.00/sf	= $ 12,600
Riprap Berms	= $ 50,000
Mobilization (10%)	= $ 42,560
Contingency (15%)	= $ 63,840
Total Option B	$ 532,000

Comments: Detour reduces construction time and eliminates constructability issues staging slab bridges.

Revisions:
None

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Iowa Department of Transportation
Form 532001wd 11-2003

RECORD OF COORDINATION
FLOODPLAIN DEVELOPMENT

The purpose of this form is to document Iowa Department of Transportation coordination with the local community for projects which are not within the Iowa Department of Natural Resources' permitting jurisdiction and which are in a community that is participating in the National Flood Insurance Program.

1. Highway Number: _____ Stream _____ Project Number _____

   File No.: _____ Design No. _____ Project Location: _____ ¼, _____ ¼, T _____ ,S _____ ,R _____

   Description of Location: _____

   _____

   City/County: _____

2. Flood Insurance Rate Map/Floodway Map:

   Panel Number: _____ , Effective Date of Map: _____

3. Type of Development: ☐ Filling ☐ Grading ☐ Excavation ☐ Bridge Construction ☐ Road Construction

   Channel Improvement: _____

   Description of Development: _____

   _____

4. Is project located in a designated 100-year floodplain?

   ☐ Yes (check the appropriate zone: ☐ A ☐ A1-30 ☐ AE ☐ AO ☐ AH) ☐ No

5. Has a detailed Flood Insurance Study (FIS) been published? ☐ Yes ☐ No

   If yes, what is the Base Flood Elevation (BFE) at project site? _____

   If no, what is the estimated BFE at project site? _____

6. Is project located in designated floodway? ☐ Yes ☐ No

7. Does FIS need to be revised? ☐ Yes ☐ No

   If yes, describe type and extent of revision: _____

   _____

IDOT Preliminary Bridge Design Engineer	Signature	Date
IDOT District Engineer	Signature	Date

Community Official Concurrence:

Community Official	Signature	Date

NOTE: Office of Bridges and Structures to submit copy to:
Bill Cappuccio
NFIP State Coordinator
Iowa Department of Natural Resources
Wallace State Office Building
502 East Ninth Street
Des Moines, IA 50319
515-281-8942

Form 621004wd
06-95

Iowa Department of Transportation

EXAMPLE

FIELD NOTES FOR BRIDGES AND LARGE CULVERTS (20' SPAN)
PRIMARY ROAD SYSTEM

LOCATION

1. County Boone Civil Twp. Worth Sec. 21 Twp. 83N Range 26W
2. Over (☐River, ☒Cr., ☐Dr. Ditch) Peese Creek Highway No. Oriole Road
3. Proj. No. ER-624-0(8)--28-08 Sta. Pres. Struct. 8+28.00 Aerial Map No.
   Sta. Prop. Struct. 8+28.00

GENERAL DATA (FIELD)

4. Drainage Area 8.75 sq-mi Character Hilly to flat Approx. length and width 4.8 mi. x 2.8 mi
5. Extreme highwater: Date of occurrence 1993 Information from Ledges State Park Flood Pole
   (Elev. near site 892.5 Location STA 6+47.21, RT 152.27') (Elev. Upstream
   Location) (Elev. downstream Location)
6. Typical highwater: Elev. 863.5 Occurs every 2 Years. Date of last occurrence Unknown
7. Average low water: (Elev. at site 862.47 Average streambed 862.27) (Water elev. 862.47 on date of survey 12/10/2010)
   (Water elev. 865.52 upstream 582 Ft.) (Water elev. 858.31 downstream 494 Ft.) Fall in stream 35.38 Ft./mi.
8. List buildings in flood plain None Location Floor Elev.
9. Upstream Land Use State Park Anticipate any Change? No
10. Is stream deepening or filling? Filling Approx. amount per year Unknown
11. Is stream widening? No Show direction, rate and amount)
12. Does stream carry appreciable amount of ice? No Elev. Of high ice
13. Does stream carry appreciable amount of large driftwood? Yes
14. Bench Mark No. BM503 RR Spike in West Face of Flood Pole Northwest of G001 STA 6+47.21, RT. 152.27'

PRESENT OR OLD STRUCTURE

15. Superstructure: Type Dual 20.5' x 7.25' Aluminum Box Culvert Skew angle 27.42° L.A.
16. Substructure: Type N/A
17. Span lengths N/A Roadway width 22' Type of floor N/A
18. Culvert: Span 20.5' Ht. 7.25' Length B-B Ppts. 59' Flowline Lt. 859.0 Rt. 859.0
19. Grade elev. 868.0 Date built 2000 IDOT Design No. SP-624-0(5)--7C-06
20. Condition of superstructure Damaged beyond repair
21. Condition of substructure
22. Remarks: Existing dual culverts damaged beyond repair from August 2010 flood.

PROPOSED STRUCTURE (OFFICE)

23. Superstructure: Type 120' x 30' Continuous Concrete Slab Bridge Skew angle 30° L.A.
24. Substructure: Type P10L, Integral Abutments
25. Span lengths (Bridge): 36.5', 47.0',36.5' Culvert B-B Ppts.
26. Culvert: Span Ht. Flowline Lt. Rt. Length Lt. Rt.
27. Roadway width 30' Type of floor Concrete Class of loading HL-93
28. Type of railing TL-4, Open Rail Option Type of curb
29. Grade elev. 871.96 Abut. Footing elev. 865.66 Pier footing elev. 858.25
30. Length and type of pilings: Abuts. HP10x42 - 45' Piers HP10x42 - 50' (P1), 55' (P2)
31. Design highwater: Elev. 867.00 Frequency 50 Year Area 8.75 sq-mi Discharge 2,272 cfs
32. What provision is made for overflow? None
33. Can channel be cleared to provide more waterway? No Are wing dikes to be provided? No
34. Is excessive local scour probable? No Probable max. depth of scour below streambed 4.40 ft.
35. Disposition of existing structure Remove
36. 2007 ADT = 530 VPD
37. Remarks:

County Boone
Project. No. ER-624-0(8)--28-08
File No. 30586 PIN 11-08-624-010
Design No. 211 Maint. No. 0800.3S624

Field Notes by Adam Bullerman, P.E. Date 2-25-11

Title Project Engineer

(over)

VALLEY CROSS SECTION DATA

The submittal of a bridge type structure will include a right angle valley section. This section should be taken downstream from the crossing. It shall be noted whether it is an average section or a control section. Enough ground shots will be taken to outline the valley to an elevation well above extreme highwater. Special care will be taken to accurately outline the main channel. Each shot should be identified; that is (FP) flood plain, (TB) top of bank, (ES) edge of stream, etc. Mannings equation roughness factors will be assigned each shot. Include site photos with this information.

Remarks: Refer to HEC-RAS model for valley cross section data

Distance	Elevation	(N) Roughness	Remarks

Distance	Elevation	(N) Roughness	Remarks

PLAT OF DRAINAGE AREA

The drainage area is to be platted as completely and accurately as possible and to the largest practicable scale on a separate sheet. Use a definite scale, as 1" equals ¼, ½, 1 or 2 miles, and indicate what scale has been used. In addition to the outlines of the watershed, indicate the positions of the streams and, roughly, the character of the soil and the relative locations of the steep and flat portions. Whenever practicable, the above information should be secured by going over the area either on foot or in a car. For most watersheds the information may be secured from the best existing data, soil maps, U.S.G.S. maps and Bulletin No. 7-1.H.R.B. No plat is necessary if the area is listed in Bulletin Number 7.

Remarks:

Give additional information by reference to marginal number on reverse side of this sheet.

Marginal No.	
5	Extreme highwater due to backwater from Saylorville Lake
10	Excessive silt deposition at this site is due to backwater from Saylorville Lake
18	Culvert flowline data based on construction plans since flow-line data could not be obtained due to culvert damage

IMPORTANT NOTE

The information given on this form must in all cases be supplemented by complete plat and profile of the site, drawn to a convenient scale on a separate sheet.

The information as shown on this form is essential and must be supplied in detail before the plans can be prepared or approved. It will be necessary to return this form for correction unless the data supplied is complete.

Instructions for Completing
Risk Assessment Form for
Bridges (Culverts) Over Waterways

This form needs to be completed only for those river bridges needing FHWA approval.

Hydrologic Evaluation

A. Check USGS Water Resources Data
B. Check Flood Insurance Studies, USGS reports, Corps of Engineer projects, etc.
C. Estimate backwater for each. (Method used is optional.) The backwater estimates should be based on the recommended structure. Method used to compute discharge is normally USGS Report 87-4132 or gaging station data if a gaging station is near the site.
D. For example, DNR Floodplain Development Permit, or Corps 404 Permit.

Property Related Evaluation

A. Low damage potential - No buildings.
   Moderate damage potential - Outbuildings.
   High damage potential - Residential/industrial.
B. For Flood Insurance Studies, all the information should be in the study. Call DNR for additional information.

Environmental Considerations

A. Check the Concept Statement or the Environmental Assessment.

Highway and Bridge (Culvert) Related Evaluation

A. Check appropriate features if any.
B. Identify recurrence interval at overtopping (proposed roadgrade) if less than 500 year.
   Length of overtopping _____ m at Q_{50}.

Miscellaneous Comments

A - E. Self Explanatory.
F. Sample comments:
   Bank stabilization may be required in the future - not recommended at this time.
   Riprap on spur dikes not recommended on this project.

Traffic Related Evaluations

A. Self explanatory.
B. Self explanatory.
C. Self explanatory.
D. Detour - If the road (structure) washed, what is the length of the posted detour route?

Present Facility

A. Self explanatory.
B. At what discharge and recurrence interval does the existing road overtop.
C. Self explanatory. Most streams draining less than 1300 sq. kilometers are subject to flash flooding.

Alternates

A. Self explanatory.
B. Self explanatory.
Discussion: If other alternatives were considered (e.g., longer bridge or shorter bridge or culvert), state in a general way and give reason for rejection.

Examples: A culvert was considered but was rejected because of drift potential.
A longer bridge was considered but was not necessary hydraulically and was too costly.

C. For most sites, further analysis would not be necessary.

Form 517002wd
11-02

Iowa Department of Transportation

RISK ASSESSMENT FOR BRIDGES (CULVERTS)
(For 20' Span and Longer Structures)

EXAMPLE

LOCATION

County Boone Civil Twp. Worth Sec. 21 Twp. 83N Range 26W
Over (River, Cr., Dr. Ditch) Peese Creek Road No. Oriole Road
Project No. ER-624-0(8)--28-08 Design Number 211 FHWA No. 699111
Assessment Prepared by Adam Bullerman, P.E. Date 2/25/11

1. HYDROLOGIC EVALUATION

A. Nearest Gaging Station available on this stream: _____ (None ☒)
B. Are flood studies available on this stream: Yes ☐ No ☒
C. Flood Data:
Q_{10} N/A cfs Est. Bkwtr. N/A ft. Q_{25} N/A cfs Est. Bkwtr. N/A ft.
Q_{50} 2,272 cfs Est. Bkwtr. -0.64 ft. Q_{100} 2,760 cfs Est. Bkwtr. -0.53 ft.
Q_{500} 3,646 cfs or Overtopping _____ cfs (Whichever is lower)
Drainage Area 8.75 sq-mi Method Used to compute Q WRIR 87-4132 w/ Mixed Landforms
D. Does the crossing require outside agency approval? Yes ☒ No ☐
List Agencies: Iowa DNR Sovereign Lands

2. PROPERTY RELATED EVALUATIONS

A. Damage potential: Low ☐ Moderate ☒ High ☐
List buildings in flood plain None Location _____
Floor Elevation _____
Upstream Land Use _____
Anticipate any Change? Yes ☐ No ☒
If yes, describe anticipated change: _____
B. Any flood zoning? (Flood Insurance Studies (FIS), etc.) Yes ☒ No ☐
Type of Study Approximate
Base flood elevation None, Zone A (100 year)
Regulatory floodway width None (As noted in FIS Studies)
Comments Boone County is currently mapped but this area has a Zone A Special Flood Hazard Area designation

3. ENVIRONMENTAL CONSIDERATIONS

A. List commitments in environmental documents which affect hydraulic design (None ☒)

4. HIGHWAY AND BRIDGE (CULVERT) RELATED EVALUATIONS

A. Note any outside features which might affect Stage, Discharge, or Frequency.
Levees ☐ Aggradation / Degradation ☐ Reservoirs ☐ Diversions ☐
Drainage Dist. ☐ Navigation ☐ Backwater from another source ☒
Other _____
Explanation Project is located in the flood pool of Saylorville Lake

B. Proposed Roadway Overflow Section (None ☒) Length _____ Elev. _____ Frequency (if < 500 yr.): _____ yr.
Embankment: Soil Type _____ Type Slope Cover _____
Comments: _____

(Page 1 of2)

5. MISCELLANEOUS COMMENTS

A. Is there unusual scour potential? Yes ☒ No ☐ Protection Needed? Yes ☒ No ☐
B. Are banks stable? Yes ☒ No ☐ Protection Needed? Yes ☐ No ☒
C. Are spur dikes needed? Yes ☐ No ☒
D. Does stream carry appreciable amount of ice? Yes ☐ No ☒ Elevation of high ice _____
E. Does stream carry appreciable amount of large driftwood? Yes ☒ No ☐
F. Comments Left abutment scour is significant and is confirmed by historic scour at this location, sheet pile walls will be installed to protect the abutments.

6. TRAFFIC RELATED EVALUATIONS

A. Present Year 2007 Traffic Count 530 VPD % Trucks 5
B. Design Year 2027 Traffic Count 1000 VPD % Trucks 5
C. Emergency Route Yes ☐ No ☒ School Bus Route Yes ☐ No ☒ Mail Route Yes ☐ No ☒
D. Detour Available? Yes ☒ No ☐ Length of Detour 11 Miles
Comments _____

7. PRESENT FACILITY

A. Low Roadway Elevation 868.12 ft
B. Bridge Hydraulic Capacity at point of overtopping 2,500 cfs Frequency (if Less than Q_{500}) 71 yr
Roadway Overflow: Length 900 ft. Elevation 868.12 ft.
C. Is flash flooding likely? Yes ☐ No ☒
Comments Present facility is a 20.5' x 7.25' Aluminum box culvert and was damaged beyond repair from the August 2010 flood.

8. ALTERNATIVES

A. Recommended Design 120' x 30' Continuous Concrete Slab Bridge
Low Superstructure (Bridge) 870.01 Top Opening (culvert) _____
Low Roadway Grade 868.12
Bridge Waterway Opening 819 SF Culvert Opening _____
B. Were other hydraulic alternates considered? Yes ☐ No ☒
Discussion 120' Bridge length required to avoid encroachment of the main channel while providing 3 feet of freeboard.

C. Is this assessment commensurate with the risks identified? Yes ☒ No ☐
or is further analysis needed? Yes ☐ No ☒

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